

PROJECT TITLE : NITRATE-REDUCTION BY CONTROLLED FERMENTATION  
PERIOD COVERED : APRIL 21 - MAY 20 1981  
WRITTEN BY : Ruf-C. (CLR)

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## 1. TRIALS

### 1.1. LEAR Trial 3

Due to the technical problems previously reported (1) trial No 3 was extended until May 1.

At a dilution rate of  $0.2 \text{ hr}^{-1}$  total denitration of the extract was achieved, but the acid consumption rose to 2.5 times greater than the usual one. As the sugar was added for the nitrate-nitrogen only, the micro-organisms found, in the lactic acid, the supplementary energy source they needed for the assimilation of both nitrate- and ammonia- nitrogen. To prove this, lactic acid was replaced at a certain moment by phosphoric acid. A few hours later, a residual amount of nitrates appeared in the fermented extract and increased until there was no more denitration at all. The influence of ammonia on nitrate-assimilation was therefore confirmed and this phenomenon will be carefully studied.

### 1.2. LEAR Trial 4

This trial was carried out from May 5 to 9 and its objective was the same as LEAR trial 2, ie the total denitration of the Burley part. In order to circumvent the problems described above, the sugar was added in a concentration corresponding to the sum of  $\text{NO}_3\text{-N}$  (730 ppm) and  $\text{NH}_3\text{-N}$  (1240 ppm). Problems occurred with the continuous denitration at a dilution rate of  $0.2 \text{ hr}^{-1}$ : 260 ppm  $\text{NO}_3\text{-N}$  remained in the fermented extract. Therefore the dilution rate was lowered and kept at 0.1 during the rest of the trial. However as in the case of LEAR trial 2, the extract became impossible to centrifuge and to concentrate because of its high viscosity. This modification was due to an infection by micro-organisms other than yeasts. Since it was the third time that such a problem occurred, the sterility of the pipes, the sampling valves and the fermenter will have to be checked.

### 1.3. LEAR Trial 5

It has been shown that some of the ammonium ions found in a strip extract came from the decomposition of nitrogen-containing constituents during a high temperature extraction. The extraction

grade of ammonia-nitrogen decreased with temperature more than that of nitrate-nitrogen. For this reason, during LEAR trial 5, a low temperature (15°C) extraction was carried out and an extract containing only a little more  $\text{NH}_3\text{-N}$  than  $\text{NO}_3\text{-N}$  (480 ppm vs 400 ppm) was obtained. This extract was fully denitrated at a dilution rate of 0.2 in the 20-l fermenter without any problems occurring. Therefore some work is being done to study the most suitable extraction conditions at low temperature, by varying the residence time, the strip to water ratio, etc (2).

## 2. CIGARETTES

Eight different test cigarettes have recently been produced (3). Most of the analytical results have been obtained and subjective evaluation will soon take place.

## 3. PILOT-PLANT

See monthly report : "Pilot-Plant Operations" May 1981 by N. Lüthi.

## 4. NINOMASS

A meeting was held on May 7 with representatives from UFA to discuss their report and future tests using Ninomass as chicken fodder (4) (5).

## 5. REFERENCES

1. Ruf-C Monthly report (April 1981)
2. Lüthi-N Monthly report (May 1981)
3. Borgognon-D Monthly report (May 1981)
4. Karbacher-P "Minutes of the meeting in Sursee" (May 8 1981)
5. Karbacher-P Monthly report (May 1981)

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